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Control of Airflow Noise From Diesel Engine Turbocharger

SAE International

Date:

Tuesday, April 12, 2011

DOI:

<http://dx.doi.org/10.4271/2011-01-0933>

Turbocharger is one of the main parts for high power and low fuel consumption. But due to high RPM of turbocharger causes noise problem. Flow in the turbocharger is very fast and unsteady so it's very hard to estimate the noise and to reduce. So, we conducted experiment in anechoic room using airflow bench which uses compressed air as the power source. Through experiment we can identify the noise component radiated from turbocharger. As we know, tonal noise is dominant component which is related to RPM and some other noise components are confirmed. To analyze noise source and mechanism in detail, we proceed to numerical analysis. First to see the flow in the turbocharger, computational fluid dynamics (CFD) method is used. Using CFD method, we can see the flow in turbocharger and get base data for acoustic analysis. Surface pressure data resulted from CFD method is used for acoustic analogy analysis and boundary element method (BEM). Using these methods, we could understand the mechanism of airborne noise and classify the noise sources.

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